

## **SCOPING REPORT OF INCORPORATING A VERTICAL CROWDER TO MOVE PREDATORS THROUGH THE PRIMARY CHANNEL**

### **Investigators**

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### **Summary**

Reclamation's Tracy Fish Collection Facility (TFCF), located in the southern Sacramento-San Joaquin Delta (Delta) was designed to divert juvenile Chinook salmon (*Oncorhynchus tshawytscha*) and striped bass (*Morone saxatilis*) from Delta Mendota Canal (DMC) flows, thereby preventing entrainment loss to the downstream Jones Pumping Plant (JPP, Bates *et al.* 1960). The TFCF uses a louver-bypass system to intercept and guide fish from DMC entrainment into collection tanks, where they are held until they are truck-transported back to the Delta and away from the immediate influence of the JPP. Predatory fishes, mainly striped bass, are able to take up residency in the primary channel and increase entrainment losses (B. Bridges, personal communication). According to the Reasonable and Prudent Alternatives in the 2009 Biological Opinion, Reclamation shall complete studies to determine methods for removal of predators in the primary channel, using physical and non-physical removal methods, with the goal of reducing pre-screen predation loss to 10 percent or less of exposed salmonids (National Marine Fisheries Service 2009).

### **Problem Statement**

Predatory striped bass can remain in the primary channel where they increase entrained fish losses. Several alternatives to move predatory fish into the secondary louver channel and holding tanks currently being investigated include use of an electrical crowder and carbon dioxide injections. This scoping study

would examine the use of other crowder systems, in particular moveable crowdors such as including hanging chains, curtain, net etc. that may effectively move predatory fish through the primary channel to the bypass openings.

## **Goals and Hypotheses**

Scope out the possibility of incorporating a moving vertical crowder to regularly move predators through the primary channel and possibly in the channel in front of the trash rack. Perform a literature review of vertical chain, curtain, net, or other similar systems to identify where these features have been installed either as barriers or crowdors. Determine the viability of using a hanging chain or other system, either alone or in combination with other crowdors, for predator crowding at the TFCF.

## **Materials and Methods**

The first year of this study would be a scoping year to identify various types of crowding systems used to regularly move fish in fast-flowing, deep, nonrectangular systems. We will also begin to conceptually develop a crowder design for use in the primary channel system, and possibly in the channel in front of the trash rack. If deemed possible and effective at the TFCF, then a crowder system could be tested in the secondary channel, and eventually the primary channel in subsequent years.

## **Coordination and Collaboration**

These studies will be coordinated with the California Department of Fish and Game's Delta diversion facilities reporting program, and the Tracy Fish Collection Facility staff. All work will be reviewed by the Tracy Technical Advisory Team through progress updates on request and reviews of study plans and all reports.

## **Endangered Species Concerns**

Discussions will be held with the US Fish and Wildlife Service, National Marine Fisheries Service and the State of California regarding vulnerability of salvaged fish to moving crowdors.

**Dissemination of Results (Deliverables and Outcomes)**

Provide summary report of scoping information by September 30, 2014.

**Literature Cited**

Bates, D.W., O. Logan, and E.A. Pesonen. 1960. Efficiency evaluation, Tracy Fish Collection Facility, Central Valley Project, California. U.S. Fish and Wildlife Service. Seattle, WA, USA.

National Marine Fisheries Service. 2009. Biological Opinion and Conference Opinion on the Long-Term Operations of the Central Valley Project and State Water Project. National Marine Fisheries Service, Southwest Region. Long Beach, CA.